

## 1 Claims

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3 1. A coolant circuit (10) with at least one heat source (12), a radiator (14), and a  
4 bypass line (22), which connects a radiator inlet (18) to a radiator return (20) and whose  
5 junction (24) has a control valve (26) disposed in it, whose throttle body (58) <sup>is controlled by</sup> ~~can be~~  
6 <sup>a control means</sup> ~~electrically triggered~~ as a function of operating parameters and environmental parameters  
7 by means of at least one control unit (40, 42) and divides the coolant flow between the  
8 radiator inlet (18) and the bypass line (22), characterized in that according to a  
9 characteristic curve of the control valve (26), the control unit (40, 42) determines a set-  
10 point value (50) for the position of the throttle body (58), which sets a ratio of the radiator  
11 volume flow to the total coolant flow at the control valve (26) which equals the ratio  
12 between the difference of a temperature at the outlet (36) of the bypass line (22) minus a  
13 set-point temperature at the inlet of the heat source (12) and the difference of the  
14 temperature at the outlet (36) of the bypass line (22) minus a temperature at the outlet of  
15 the radiator (14), where the ratio of the radiator volume flow to the total coolant flow is  
16 set equal to zero when there is a negative value and is limited to one when there is a value  
17 greater than one.

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19 2. The coolant circuit (10) according to claim 1, characterized in that the throttle  
20 body (58) is embodied as a valve tap, has at least one distributor conduit (72) passing  
21 through it, and can be moved around a rotation axis (64) by a drive mechanism (44).

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23 3. The coolant circuit (10) according to claim 2, characterized in that the throttle  
24 body (58) has a spherical surface and an internal distributor conduit (72), which extends  
25 lateral to a rotation axis (64) and is open at one circumference surface (82) essentially  
26 parallel to the rotation axis (64), while the opposite circumference surface (84) is closed.

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28 4. The coolant circuit (10) according to [one of claims 2 or 3] claim 2,  
29 characterized in that the throttle body (58) is supported in a valve body (60) that has a  
30 temperature sensor (32), which protrudes into the distributor conduit (72) in the vicinity  
31 of the rotation axis (64).

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2 5. The coolant circuit (10) according to [one of the preceding claims] claim 1,  
3 characterized in that <sup>a</sup>the first control unit (40) generates the set-point value (50) for the  
4 position of the throttle body (58) and <sup>b</sup>the second electronic control unit (42), which is  
5 integrated into the control valve (26), processes this set-point value, along with a detected  
6 actual value (52) of the position of the throttle body (58) to produce a correcting variable  
7 for the position of the throttle body (58).  
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9 6. The coolant circuit (10) according to claim 5, characterized in that at least one  
10 of the control units (40, 42) can be programmed for different valve characteristic curves.  
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12 7. The coolant circuit (10) according to [one of the preceding claims] claim 1,  
13 characterized in that at least one of the control units (40, 42) has a malfunction detection  
14 and in the event of a malfunction of the first control unit (40), switches to an emergency  
15 operation in which the second control unit (42) receives control signals from additional  
16 sensors.  
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18 8. The coolant circuit (10) according to [one of the preceding claims] claim 1,  
19 characterized in that the control is subordinate to a regulation as a function of a  
20 temperature at the inlet of the heat source (12).  
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22 9. The coolant circuit (10) according to claim 8, characterized in that <sup>a</sup>the  
23 correcting variable of the regulating device is limited to a part of the adjustment path of  
24 the throttle body (58).  
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26 10. The coolant circuit (10) according to claim 8 [or 9], characterized in that the  
27 regulating device is a gain-scheduling P regulator.  
28

29 11. The coolant circuit (10) according to claim 9 [or 10], characterized in that the  
30 regulating device monitors the proper functioning of the control valve (26).  
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1           12. The coolant circuit (10) according to [one of the preceding claims] claim 1,  
2 characterized in that a number of heat sources (12) and/or heat sinks (14) are provided.

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4           13. The coolant circuit (10) according to [one of the preceding claims] claim 1,  
5 characterized in that instead of using the temperature at the outlet (36) of the bypass line  
6 (22), the temperature downstream of the heat source (12) and/or at the junction (24) of  
7 the bypass line (22) is used for the control.

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